

CLASSIFICATION **CONFIDENTIAL**
 CENTRAL INTELLIGENCE AGENCY
 INFORMATION FROM
 FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

50X1-HUM

CD NO.

COUNTRY USSR

DATE OF
INFORMATION 1950

SUBJECT Scientific - Electricity, electric power

DATE DIST. / *sep* 1950HOW
PUBLISHED Monthly periodicalWHERE
PUBLISHED Moscow

NO. OF PAGES 4

DATE
PUBLISHED Jan 1950SUPPLEMENT TO
REPORT NO.

LANGUAGE Russian

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE
 OF THE UNITED STATES WITHIN THE MEANINGS OF ESPIONAGE ACT 50
 U. S. C. 31 AND 32, AS AMENDED. ITS TRANSMISSION OR THE REVELATION
 OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PRO-
 HIBITED BY LAW. REPRODUCTION OF THIS FORM IS PROHIBITED.

THIS IS UNEVALUATED INFORMATION

SOURCE Elektrichestvo, No 1, 1950.

NOMINAL VOLTAGES OF STATIONARY ELECTRICAL NETWORKS

(Project for a Standard)

This project was compiled by the Central Scientific Research Electrical Laboratory, Ministry of Electric Power Stations (TsNIEL, MES), and is printed for the information of interested organizations and for discussion by electrical engineers.

A. Field of Application

1. This standard shall apply to DC and 50-cycle AC stationary electric power networks, including transformers, power cables, and similar equipment, and to generators and power-consuming apparatus connected to them.
2. This standard shall not apply to:
 - a. Electric networks of mobile installations (railroad rolling stock, automobiles, aircraft, river and ocean ships, etc.).
 - b. Electric networks of radio engineering installations, communications, railroad signalling, and automatic interlocking.
 - c. Electric networks of special stationary installations (electric traction installations, electric furnaces, electrolysis installations, rectifiers, etc.).
 - d. Welding and charging generators.
 - e. Enclosed circuits inside receivers and units (circuits for individual excitation of machines, etc.).
 - f. Measuring instruments, relays, etc.

NOTE: (i) The electric circuits of equipment listed in Paragraph 2 which are intended to be connected to stationary electric networks should have nominal voltages in accordance with this standard.

- (ii) The use of the nominal voltages given in this standard is recommended for the electric networks enumerated in 2 a. and b.

- 1 -

CONFIDENTIAL

CLASSIFICATION		CONFIDENTIAL		DISTRIBUTION							
STATE	<input checked="" type="checkbox"/>	NAVY	<input checked="" type="checkbox"/>	NSRB							
ARMY	<input checked="" type="checkbox"/>	AIR	<input checked="" type="checkbox"/>	FBI							

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

B. Definitions

1. The nominal voltage of a stationary electric network, hereafter termed the "nominal network voltage," shall be the stipulated voltage established for it, which determines that corresponding nominal voltages of transformers, power cables, and apparatus operating in the network, and generators and receivers of electric power connected directly to it.

2. The nominal voltage of generators, transformers, and receivers of electrical energy shall be the voltage at which they are intended to work under optimum conditions.

3. The nominal voltage for apparatus and power cables shall be the nominal voltage of the network in which they are designed to operate.

4. The highest network voltage shall be the largest voltage at which, for prolonged and reliable operation, all the equipment of this network and receivers of electric power connected directly to it should be designed.

C. Tables of Nominal Voltages

Table 1. Nominal Voltages up to 100 Volts

Nominal Voltages, v		
DC	3-phase 50 cycles (interphase)	Single-phase 50 cycles
6	--	--
12	--	12
24	--	--
--	36	36
48	--	--

Table 2. Nominal Voltages of 100 to 1,000 Volts

Nominal Voltages for
Network and Receivers
of Electric Power, v

3-phase 50 cycles			Generators			Transformers		
DC	Interphase	Phase	DC	3-phase 50 cycles (interphase)	3-phase 50 cycles (interphase)	Primary Windings	Secondary Windings	Single-phase 50 cycles
110	--	--	115	--	--	--	--	--
--	--	--	--	--	--	--	--	--
220	220	127	230	230	220	230	220	127
--	380	220	--	400	380	400	380	230
440	--	--	460	--	--	--	--	--
--	1,000	--	--	1,050	1,000	1,050	1,000	--

- 2 -

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

Table 3. Nominal Voltage over 1,000 Volts

Nominal Voltage of 3-phase, 50- cycle Networks, kv	Receivers of Electric Power, Apparatus and Power Cables	Nominal 50-cycle, 3-phase Interphase Voltages, kv			Highest Voltage of 3-phase, 50-cycle Network kv
		Generators	Transformers Primary Windings	Secondary Windings	
3	3	3.15	3 & 3.15	3.15 & 3.3	3.5
6	6	6.3	6 & 6.3	6.3 & 6.6	7.0
10	10	10.5	10 & 10.5	10.5 & 11	11.5
--	--	(13.8)	(13.8)	--	--
--	--	15.75	(15.75)	--	--
20	20	21	20 & 21	21 & 22	23
35	35	--	35	38.5	40.5
(60)	60	--	60	66	69
110	110	--	110	121	127
150	150	--	150	165	173
220	220	--	220	242	253
400	400	--	400	440	440

NOTES

1. Voltages of 13.8 and 15.75 kilovolts may be used for turbogenerators of 100 megawatts and over and hydrogenerators of 50 megawatts and over, and the primary windings of transformers directly connected to them if there are no consumers at generator voltage and considerable technical and economic advantages can be attained thereby.

2. The voltages 3.15, 6.3, 10.5, and 21 kilovolts of primary transformer windings refer to transformers connected directly to collector busbars or to generator terminals.

3. The voltages 3.3, 6.6, 11, and 22 of secondary transformer windings refer to step-down transformers with high short-circuit voltages (7.5 percent and more).

4. Transformers and receivers of electric power may be manufactured for existing networks with nominal voltages of 0.5, 2.1, 15, and 31.5 kilovolts.

5. Equipment for a voltage of 60 kilovolts shall be manufactured both for existing installations and for new installations with a limited number of modifications.

6. The nominal voltages of synchronous condensers shall be established by GOSTs on the basis of nominal voltages of generators or the secondary windings of transformers, in accordance with the present standard.

7. Manufacture of the same equipment for operation in networks of different nominal voltages shall be permitted if manufacture of equipment for each voltage is not feasible, e.g., one-kilovolt cables can also be used in networks with nominal voltages of 220, 380 volts etc.).

In the ensuing discussion, Engineer K. A. Smirnov of TsNIEL MES pointed out in detail how the new standard eliminated shortcomings of the old one and explained reasons for selecting nominal voltages listed above. Engineer S. M. Livshits of Moscow reviewed historical aspects of development of nominal voltages in various countries and discussed the proposed standard, stressing economic aspects; he also favored excluding nominal voltage of 660 or 1,000

- 3 -

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

50X1-HUM

volts, adding a DC voltage of 600 volts, and possibly substituting another voltage for the 10-kilovolt value (perhaps a single voltage in the 6-35 kilovolt range). Prof A. A. Gorev, Doctor of Technical Science, Leningrad Polytechnic Institute imeni Kalinin, discussed the question by relating voltages, old and proposed, to natural transmission line capacity. He gave reasons for favoring two nominal voltages, 310 and 380 kilovolts, in place of the 400-kilovolt voltage.

- E N D -

- 4 -

CONFIDENTIAL

CONFIDENTIAL